

AMENDMENTS TO THE DRAWINGS

The attached sheets of drawings includes FIGS. 19A-19H and FIGS. 20A-20C. Applicant respectfully submits that these drawings do not constitute new matter because they were included in the parent U.S. patent application Serial No. 09/494,549, filed on January 31, 2000, now U.S. Patent No. 6,618,344, issued on September 9, 2003, which was incorporated by reference in its entirety by the preliminary amendment filed on July 18, 2003.

Attachments: Replacement sheet for FIGS. 19A-19H
 Replacement sheet for FIGS. 20A-20C.

REMARKS

By this amendment, claims 48 and 49 have been amended. Claims 30-44, 46, 48, and 49 are pending in the application. Applicants reserve the right to pursue the original claims and other claims in this and other applications.

Two sheets of drawings have been submitted to include FIGS. 19A-19H and FIGS. 20A-20C. Applicant respectfully submits that these drawings do not constitute new matter because they were included in the parent U.S. patent application Serial No. 09/494,549, filed on January 31, 2000, now U.S. Patent No. 6,618,344, issued on September 9, 2003, which was incorporated by reference in its entirety by the preliminary amendment filed on July 18, 2003.

The Amendment filed on December 8, 2005 is objected to with regard to claims 30 and 43 under 35 U.S.C. § 132 (new matter). The Office Action states that the feature of “unpatterned substrate” lacks support. (Office Action, page 2). This objection is respectfully traversed.

Applicant submits that the specification provides explicit and literal support for the amendment “wherein said transparent substrate remains unpatterned” in claim 30 and the amendment “unpatterned substrate” in claim 43 in FIGS. 16A-16F and 19A-19H as discussed in the Amendment filed on June 26, 2006. Furthermore, these limitations are supported by the specification at paragraph [0136], which states, “the unmasked portions of the birefringence layer 93 are completely removed (up to the substrate 92) by etching as shown in FIG. 16D” and at paragraph [0145], which states, “the unmasked portions of the birefringence layer 93 are completely removed (up to the substrate 92) by etching.” Therefore, the specification makes it clear that only layers up to the substrate are etched, thus leaving the substrate itself unetched and therefore unpatterned. Applicant respectfully requests that the objection be withdrawn.

The Office Action states that the specification cannot teach that the substrate remains unpatterned because an irregularity will be caused on the substrate if it is exposed during the manufacturing process. (Office Action, page 2-3). Applicant respectfully disagrees. Applicant's specification does not teach that the exposed substrate will be marred by an irregularity. Further, even if the substrate were to suffer very small random marks from exposure as suggested by the Office Action, small random marks do not constitute "patterning" because they do not form a pattern.

The Amendment filed on December 8, 2005 is objected to with regard to claims 48 and 49 under 35 U.S.C. § 132 (new matter). Also, claims 48 and 49 are rejected under 35 U.S.C. 12, first paragraph as failing to comply with the written description requirement and are objected to as being confusing and indefinite. The Office Action states that the feature of "wherein a top portion of the substrate is exposed" lacks support in the specification and is confusing and indefinite. (Office Action, pages 3-4). This objection is respectfully traversed.

Claims 48 and 49 have been amended to state that "a top surface portion of the substrate is not covered by the uni-directionally stretched organic polymer layer." Support for this amendment may be found in the specification at paragraph [0136], which states, "the unmasked portions of the birefringence layer 93 are completely removed (up to the substrate 92) by etching as shown in FIG. 16D" and at paragraph [0145], which states, "the unmasked portions of the birefringence layer 93 are completely removed (up to the substrate 92) by etching." Therefore, the specification makes it clear that the organic polymer layer is completely removed up to the substrate, thus leaving the substrate not covered by the uni-directionally stretched organic polymer layer. Applicant respectfully requests that the rejection and objection be withdrawn.

Claims 30-32 and 35-42 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,739,952 ("Takeda '952") in view of U.S. Patent No. 5,244,713 ("Nakamura") and U.S. Patent No. 5,793,733 ("Takeda '733"). The rejection is respectfully traversed.

With regard to claims 30-43, 44, and 46, the Office Action fails to make a *prima facie* case of obviousness because there is no proper suggestion or motivation or reasonable expectation of success to combine Takeda '733 and Nakamura with Takeda '952. To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991).

With regard to claim 30, Takada '952 does not teach "drying said substrate and removing said organic polymer material from said substrate", "heating and stretching said organic polymer material to form a uni-directionally stretched birefringence layer", or "attaching said uni-directionally stretched birefringence layer onto said substrate with an adhesive layer". The Office Action states it would be obvious to "use the well-known heating and uniaxial stretching method and the well known organic polymer materials" of Nakamura in the method taught by Takeda '952 and that the motivation would be "for the benefit of using a manufacture method to obtain *optimum* bifringence of the film, and to cut manufacturing cost by using conventionally accessible and known polymer materials." Applicant respectfully disagrees.

The organic polymer materials taught by Nakamura cannot be properly combined with the process or product of Takada '952 because Takada '952 teaches away from the combination. It is improper to combine references where the references teach away from their combination. *In re Grasselli*, 713 F.2d 731, 743, 218 USPQ 769, 779 (Fed. Cir. 1983). Takeda '952 teaches using an oriented film made of polydiacetylene in a polarizing beam splitter. Nakamura, on the other hand, does not teach forming a film out of polydiacetylene nor does Nakamura teach that the films of Nakamura may be used as a polarized beam splitter. Takeda '952 teaches that it is desirable to use an oriented film made of polydiacetylene for very specific reasons, for example, because polydiacetylene 1.) "is inherently small in the temperature dependency of refractive index and hence, it contributes to enhancement in the environmental resistance of the polarizing beam splitter," 2.) "has inherently high crystallinity and hence contributes to uniformity in the characteristics of the polarizing beam splitter," and 3.) has the "ability to cause a great degree of birefringence and, hence, it can be formed in a sufficiently small thickness to realize a compact polarizing beam splitter" (column 7, line 66 to column 8, line 8). Therefore, Takada '952 teaches that it is desirable to use polydiacetylene as the polymer in the oriented film and teaches away from substituting another polymer, such as any of the "conventionally accessible and known polymer materials" taught by Nakamura, as suggested by the Office Action. One of ordinary skill in the art would not have looked to Nakamura to substitute a conventional polymer for the specialized polymer taught by Takada '952 without the benefit of improper hindsight.

Further, one of ordinary skill in the art would not look to Nakamura to substitute the process of uni-axially stretching a film taught by Nakamura (column 4, lines 14-18) for the process of evaporating a monomeric diacetylene film onto a substrate and rubbing a film to orient it in one direction as taught by Takada '952

(column 8, lines 20-23) for the purpose of “obtain[ing] *optimum* birefringence of the film” as stated by the Office Action, because Takada ‘952 does not suggest the orientation of the film produced by the method of Takada ‘952 is less than optimal or requires improvement in any way. To the contrary, Takeda ‘952 teaches that “the polydiacetylene film can be provided with in-plane orientation by merely rubbing the film in one direction”. (column 8, lines 42-48). Further, because Nakamura does not teach that the films of Nakamura may be used as a polarized beam splitter, Nakamura does not teach that the film may be optimized for the polarized beam splitter taught by Takeda ‘952 nor that the film of Nakamura would actually improve the polarized beam splitter of Takeda ‘952 in any way. The phrase “the above obtained optical film is subjected to uniaxial or biaxial stretching so as to possess the optimum birefringence” as used by Nakamura (column 4, lines 14-18) merely states that the film may be stretched to any degree desired.

Further, one of ordinary skill in the art would not look to Nakamura to substitute the process of uni-axially stretching a film taught by Nakamura (column 4, lines 14-18) for the process of rubbing a film to orient it in one direction as taught by Takada ‘952 (column 8, lines 20-23) because the process of Nakamura is necessarily more complex. Takeda ‘952 teaches that “the polydiacetylene film can be provided with in-plane orientation by merely rubbing the film in one direction” and that the rubbing process “contribute[s] to easy fabrication of the polarizing beam splitter”. (column 8, lines 42-48). The process of Takeda ‘952 involves only forming a monomeric diacetylene film over the glass substrate, polymerizing the diacetylene, and rubbing the polymer to orient it in one direction. (column 8, lines 14-23). Nakamura, on the other hand, teaches continuously preparing a thermoplastic resin film by solvent casting while maintaining a proper concentration and reducing periodic thickness variation (column 3, lines 22-54), presumably removing the film from a casting belt or roll,

heating the film to the proper temperature and stretching the film while maintaining a proper stretch ratio (column 4, lines 19-41), heat treating the film (column 4, lines 42-50), and, assuming *arguendo* that the film could be combined with the polarizing beam splitter of Takeda '952, the film would have to be cut to a proper size, aligned with a substrate, and somehow attached. Therefore, one of ordinary skill in the art would not substitute the simple and efficient process taught by Takeda '952 with the complex process taught by Nakamura without the benefit of improper hindsight.

Further, with regard to claim 30, the Office Action fails to make a *prima facie* case of obviousness because neither Takeda '952 nor Nakamura provide a reasonable expectation of success by combining Nakamura with Takeda '952. Takeda '952 teaches using an "oriented polydiacetylene film" in a polarizing beam splitter for the very specific reasons discussed above. Neither Takeda '952 nor Nakamura provide a reasonable expectation that substituting any of the common polymers taught by Nakamura with the polarizing beam splitter of Takeda '952 would produce a successful polarizing beam splitter.

Claim 43 has been rejected by the Office Action in view of Takeda '952 and Nakamura using similar reasoning as was provided for claim 30. (Office Action, pages 10-11). Applicant traverses this rejection for reasons similar to those given above with regard to claim 30. Claims 31-32 and 35-42 depend from claim 30, and should be allowable for at least the reasons provided above, and on their own merits. Claims 44 and 46 depend from claim 43, and should be allowable for at least the reasons provided above, and on their own merits. In view of the above remarks, Applicant respectfully requests that the rejection of claims 30-44 and 46 be withdrawn.

With regard to claim 35, The Office Action acknowledges that Nakamura discloses a heat-stretching process conducted at a temperature between 190 to 230°C

(Office Action, page 7), and concludes that it would be an obvious modification to use a temperature of 350°C. Applicant respectfully submits that this is *not* the proper standard for setting forth a *prima facie* case of obviousness. See M.P.E.P. § 2144.05. Nakamura discloses a temperature that is at least 120°C cooler than Applicant's claimed temperature in forming the birefringence layer, *i.e.*, 350°C. There is no evidence that the temperatures are close enough that one of ordinary skill in the art would believe them to have the same properties. There is a significant difference between the temperatures at which the two birefringence films are formed. Further, Applicant's claimed temperature of 350°C does not lie within Nakamura's disclosed range. Accordingly, a *prima facie* case of obviousness has not been established.

With regard to claims 37-39, the Office Action acknowledges that the cited references "do not teach explicitly to have the particular values claimed in the claims." (Office Action, page 8). Applicant respectfully submits that the cited references do not teach or disclose any refractive indices which are close to Applicant's cited refractive indices. Again, a *prima facie* case of obviousness has not been properly set forth. See M.P.E.P. § 2144.05. Instead, the Office Action appears to be explicitly relying on improper hindsight by stating that "such modification is considered to be obvious matters of design choices to one of ordinary skill in the art to make the birefringence film with desired refractive indices so that the polarization beam splitter with the holographic grating pattern will behave as desired." (Office Action, page 8). With regard to claim 37, the cited references do not disclose or suggest "a refractive index . . . in said one direction of stretching is about 1.62," as recited in claim 37. With regard to claim 38, the cited references do not disclose or suggest that "the refractive index for said organic polymer material in a direction perpendicular to said one direction of stretching is about 1.49." The cited references do not disclose or suggest the refractive index for a birefringent film in a perpendicular direction.

With regard to claims 40 and 41, the Office Action manipulates equations 26 and 28 (Takeda '952, column 14, lines 20-37). However, Applicant respectfully submits that the equations taught by Takeda '952 as manipulated by the Office Action are not equivalent to the equations of claims 40 and 41. For example, claims 40 and 41 contain the character " n_1 ", which "is a refractive index of an isotropic overcoat layer". Equations 26 and 28 of Takeda '952 do not account for an overcoat layer (column 14, lines 20-40) because Takeda '952 does not teach an isotropic overcoat layer with relation to equations 26 and 28. (see FIG. 7, to which equations 26 and 28 relate). Therefore, because equations 26 and 28 of Takeda '952 do not account for an isotropic overcoat layer, the equations do not meet the limitations of claims 40 and 41.

With regard to claim 42, the Office Action acknowledges that the cited references "do not teach explicitly to use spin coating for applying the organic polymer to the substrate." (Office Action, page 9). The Office Action states that such a modification would have been obvious. However, this unsupported statement alone cannot serve to set forth a *prima facie* case of obviousness. See M.P.E.P. § 2144.05.

Claims 33-34 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Takeda '952, Nakamura, Takeda '733, and further in view of U.S. Patent No. 5,245,456 ("Yoshimi") and U.S. Patent No. 6,040,418 ("Yamamoto"). The rejection is respectfully traversed. Claim 33 depends from independent claim 30 and claim 34 depends from claim 33. For at least the reasons provided above regarding claim 30, claims 33 and 34 should be similarly allowable with claim 30. In addition, the "requisite prior art suggestion to combine becomes less plausible when the necessary elements can only be found in a large number of references. . . ." *Eli Lilly & Co. v. Teva Pharms. USA, Inc.*, 2004 U.S. Dist. LEXIS 14724 at *104; 2 *Chisum on Patents* § 5.04[1][e][vi]. In the present application, the lack of identifiable objective motivation to combine the five references,

in addition to the sheer number of disparate references applied by the Office Action, is sufficient to overcome the asserted obviousness arguments.

Claims 48 and 49 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent Number 5,245,471 ("Iwatsuka") in view of Nakamura. The rejection is respectfully traversed.

With regard to claims 48 and 49, Iwatsuka does not teach "forming a uni-directionally stretched organic polymer layer over said substrate". The Office Action states it would be obvious to "use a birefringence layer that is comprised of an uniaxially stretched polymer layer" as taught by Nakamura "for the benefit of allowing different materials being used to form the polarization grating and at same time using a birefringence layer that is made to have *optimized* birefringence which is essential for the function of the polarization hologram." (Office Action, page 12). Applicant respectfully disagrees.

One of ordinary skill in the art would not look to substitute the polymer film taught by Nakamura for the inorganic birefringent material (column 5, lines 31-42) used in the polarizer taught by Iwatsuka merely "for the benefit of allowing different materials being used to form the polarization grating" as asserted by the Office Action. The statement that the materials are different is a mere truism, and does not describe an actual benefit that would motivate one of ordinary skill in the art to change materials. The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990)

Further, one of ordinary skill in the art would not look to Nakamura to substitute the process of uni-axially stretching a film taught by Nakamura (column 4,

lines 14-18) for the process of depositing an inorganic film by oblique deposition taught by Iwatsuka (column 5, lines 31-42) for the purpose of “obtain[ing] *optimum* birefringence of the film” as stated by the Office Action, because Iwatsuka does not teach that the inorganic film is less than optimal. To the contrary, Iwatsuka specifically discloses the materials and the thickness of the individual layers required to achieve the diffraction phenomena. (column 4, lines 6-40). Further, Iwatsuka relies only on the materials and the thickness of the individual layers and does not require further treatment to align the layers. Thus, there is no motivation to use a uniaxially stretched birefringence film to optimize birefringence in the polarizer of Iwatsuka. Further, because Nakamura does not teach that the films of Nakamura may be used as a polarizer, Nakamura does not teach that the film may be optimized for the polarized beam splitter taught by Takeda '952. The phrase “the above obtained optical film is subjected to uniaxial or biaxial stretching so as to possess the optimum birefringence” as used by Nakamura (column 4, lines 14-18) merely states that the film may be stretched to any degree desired.

Further, one of ordinary skill in the art would not look to Nakamura to substitute the process of uni-axially stretching a film taught by Nakamura (column 4, lines 14-18) for the process of forming an inorganic film by oblique deposition as taught by Iwatsuka (column 5, lines 31-42) because the process of Nakamura is necessarily more complex. Iwatsuka teaches that the inorganic film formed by oblique deposition “has a fibrous columnar structure tilted with respect to the substrate, or an anisotropic structure, which gives rise to a difference between the refractive index relative to the linearly polarized light in the tilted direction and the refractive index relative to the linearly polarized light in the orthogonal direction”. (column 5, lines 58-64). Therefore, the process of Iwatsuka involves only depositing an inorganic film over the glass substrate. (column 5, line 64 to column 6, line 4). Nakamura, on the other hand, teaches continuously preparing a thermoplastic resin film by solvent casting while

maintaining a proper concentration and reducing periodic thickness variation (column 3, lines 22-54), presumably removing the film from the casting belt or roll, heating the film to the proper temperature and stretching the film while maintaining a proper stretch ratio (column 4, lines 19-41), heat treating the film (column 4, lines 42-50), and assuming *arguendo* that the film could be combined with the polarizing beam splitter of Iwatsuka, the film would have to be cut to a proper size, aligned with a substrate, and somehow attached. Therefore, one of ordinary skill in the art would not substitute the simple and efficient process taught by Iwatsuka with the complex process taught by Nakamura without the benefit of improper hindsight.

Further, claim 48 recites, *inter alia*, "wherein the polarization hologram is configured to substantially satisfy the following requirements: $\dots (n_s - n_1)h = (m + 1/2)L$." Iwatsuka does not disclose this limitation. To the contrary, Iwatsuka only discloses in formula (IV) that $(n_1 - n_2)d = (N_2 + 1/2)$. (column 5, line 1). Assuming *arguendo* that $n_1 = n_s$, $n_1 = n_2$, $d = h$, and $N_2 = m$, then Iwatsuka only teaches $(n_s - n_1)h = (m + 1/2)L$, which does not meet the limitation of claim 48. The Office Action states that the equations of Iwatsuka must meet the limitations of claim 48 because the polarization diffraction grating of Iwatsuka operates in the same way as the present invention. (Office Action, page 16). However, this argument is explicitly contradicted by Iwatsuka because Iwatsuka explicitly teaches that the invention does not meet the equation of claim 48. Nakamura does not correct the deficiencies of Iwatsuka.

Therefore, in view of the above remarks, Applicant respectfully requests that the rejection of claims 48 and 49 be withdrawn.

Claims 43-44 and 46 stand rejected under the judicially created doctrine of obviousness type double-patenting as being unpatentable over claims 1-9 of U.S. Patent No. 6,618,344 ("Funato"). The rejection is respectfully traversed. Applicant respectfully

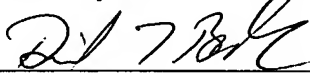
submits that the claims of the present application recite important limitations that are not obvious over the claims of Funato. For instance, claim 1 of Funato recites an *optical pickup apparatus* with "a birefringence layer of a stretched organic polymer material." Claims 2-9 of Funato depend from claim 1.

Claim 43 of the present application, in contrast, defines a *polarization hologram* structure and recites "a uni-directionally stretched birefringence layer with a periodic grating pattern comprising organic polymer material affixed to said *unpatterned* substrate . . . wherein the depth of said periodic grating pattern is essentially equal to a thickness of said uni-directionally stretched birefringence layer." (emphasis added). Claim 1 of Funato does not disclose that the depth of the periodic grating pattern is essentially equal to a thickness of a uni-directionally stretched birefringence layer, much less an *unpatterned* substrate.

In view of the above amendment and remarks, Applicant believes the pending application is in condition for allowance.

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Respectfully submitted,

By 

Mark J. Thronson

Registration No.: 33,082

David Beck

Registration No.: 54,985

DICKSTEIN SHAPIRO LLP

1825 Eye Street, NW

Washington, DC 20006-5403

(202) 420-2200

Attorneys for Applicant